

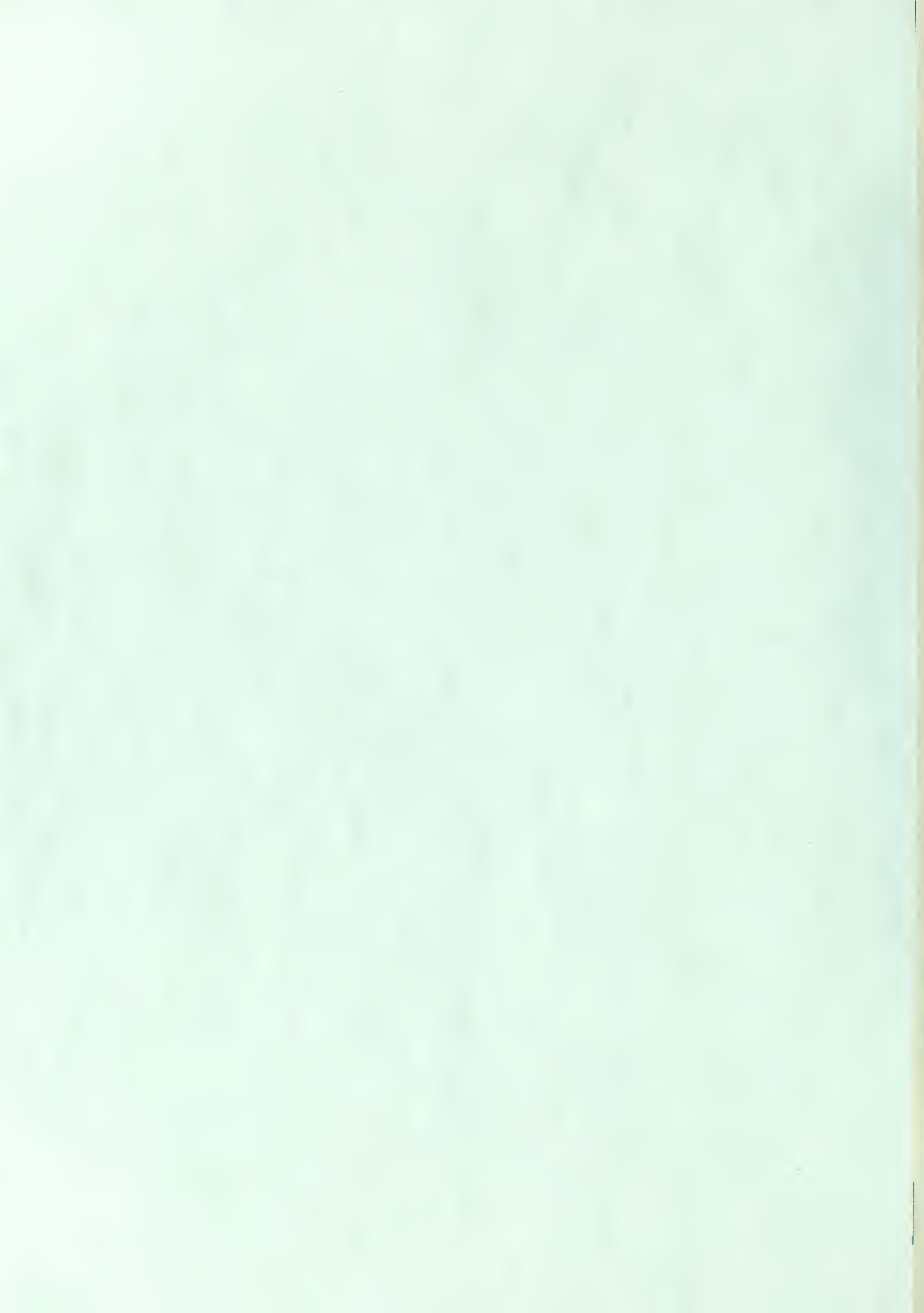
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# 1977 Insect Pest Management Guide

## HOME, YARD, and GARDEN

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Much has been said about the effects of pesticides, particularly insecticides, on the health and well-being of the American people. However, you are also aware that you are constantly faced with a horde of insects, intent upon destroying your property or making your life uncomfortable. Destruction of crop residues, varietal selection, hand-picking, fertilization, tree pruning, irrigation, screening, and other practices may reduce the numbers of insects with which you must contend. Occasionally you can even avoid or at least reduce the destruction by some pests without using an insecticide, but for most insects you must rely on an insecticide to provide the satisfactory management that you want.

By careful use of insecticides and other pest management tools, you can enjoy reasonable freedom from insects without endangering either yourself, your family, or your pets. You must recognize, however, that insecticides are designed to destroy one group of animals—insects—and can be harmful to other animals, including man himself, if used with disregard of normal safety precautions. It is up to each insecticide user to handle, apply, and store insecticides safely to reap their benefits without suffering from their dangers.

This publication lists certain insecticides to control insect pests of food, fabrics, structures, man and animals, lawns, shrubs, trees, flowers, and vegetables. We have tried to suggest only the safest materials. Many people prefer to employ the services of a professional exterminator or custom applicator rather than to become involved with selection and application of an insecticide.

The names used in these tables are the common coined chemical names, not the trade names, and as such may not be familiar to you. For instance, the common name for

*Cygon* is *dimethoate*. If there is no coined chemical name, the trade name is used but is capitalized.

Requested label clearances for a few uses of some insecticides, carriers, and solvents are uncertain for 1977, since many requests have not yet been officially cleared. Consequently, labels may be cancelled and the product removed from the market at any time. Anticipating this, we took a conservative attitude a few years ago and began modifying these suggested uses. We have attempted to anticipate any further label changes in 1977, but there still may be an occasional use cancelled. Be sure to check with your local county extension adviser if you are not sure about the insecticide you plan to use. We will make announcements of label changes through the news media in an attempt to keep you up to date.

Suggestions for use of insecticides, effective from a practical standpoint, are based on available data. Many factors affect efficiency of control. Report details of control failures to us.

In using these tables always read the footnotes before using the insecticides. They list precautions and other pertinent information.

These suggestions are subject to change without notification during the year.

Leaflets describing the life history, habits, and damage of specific insects and nonchemical methods of control can be obtained from offices of county extension advisers or by writing to Entomology Extension, 169 Natural Resources Building, Urbana, Illinois 61801. These are indicated by an NHE number in the tables.

This circular was prepared by entomologists of the University of Illinois College of Agriculture and the Illinois Natural History Survey.

## VEGETABLE INSECTS

Insects	Crop	Insecticide	Suggestions
Aphids (NHE-47) Leafhoppers (NHE-22) Mites (NHE-58) Thrips	Most garden crops	malathion or diazinon	Apply on foliage to control the insects. Aphids and leafhoppers transmit plant diseases; early control is important. Mites web on the underside of leaves; apply insecticide to underside of leaves early before extensive webbing occurs.
Blister beetles (NHE-72) Cutworms (NHE-77) Flea beetles (NHE-36) Grasshoppers (NHE-74) Leafhoppers (NHE-22) Picnic beetles (NHE-40)	Most garden crops	carbaryl	For cutworms, attach collars of paper, aluminum foil, or metal at planting for small numbers of plants, or apply insecticide to base of plants at first sign of cutting. Control grasshoppers in garden borders when hoppers are small. For picnic beetles, pick and destroy overripe or damaged vegetables.
All cabbage worms (NHE-45)	Cabbage and related crops, salad crops, and leafy vegetables	<i>Bacillus thuringiensis</i> <sup>1</sup>	Presence of white butterflies signals start of infestation. Control worms when small. It is almost impossible to raise cole crops in Illinois without controlling these pests.
Hornworms (NHE-130)	Tomatoes	carbaryl <i>Bacillus thuringiensis</i> <sup>1</sup>	Handpicking usually provides satisfactory control.
Earworms (NHE-33)	Tomatoes and sweet corn	carbaryl	Apply to late-maturing tomatoes 3 to 4 times at 5- to 10-day intervals from small-fruit stage. Apply at fresh-silk stage to early and late corn every 2 days 4 to 5 times.
Colorado potato beetles	Eggplant, potatoes, tomatoes	carbaryl	Apply as needed. Insects usually present only in late May and June.
Potato leafhoppers (NHE-22)	Potatoes, beans	carbaryl or malathion	Apply 3 to 4 times at weekly intervals starting in late May or early June. Late potatoes and beans require additional treatments. Most serious pest of potatoes and beans in Illinois.
Bean leaf beetles (NHE-67)	Beans	carbaryl	Leaves are riddled in early plantings. Apply once or twice as needed.
Mexican bean beetle	Beans	carbaryl	Except for southern Illinois, only a pest of late beans. Apply insecticide to underside of leaves.
Cucumber beetles (NHE-46)	Vine crops	carbaryl	Apply as soon as beetles appear in spring. When blossoming begins, apply insecticide late in the day so as not to interfere with pollination by bees.
Squash vine borers	Squash	carbaryl	Make weekly applications to crowns and runners when plants begin to vine. Apply late in day.
Corn borer	Sweet corn	carbaryl	Apply 4 times every 3 days to whorl and ear zone of early corn when feeding appears on whorl leaves.
Soil insects	All crops	diazinon	Apply 1 ounce per 1,000 sq. ft. Mix $\frac{1}{4}$ pint (4 fluid ounces) of 25% diazinon emulsion in enough water to cover 1,000 sq. ft., usually 2 to 3 gallons. Rake into soil.

### Days to Wait Between Application and Harvest

	Collards, kale, and other leafy crops	Beans	Lettuce	Cabbage and related crops	Sweet corn	Onions	Vine crops <sup>2</sup>	Tomatoes	Pumpkin	Eggplant	Peas	Potatoes
carbaryl	14	0	14	3	0	..	0	0	0	0	0	0
diazinon	..	7	..	7	..	..	3	3	..	..	0	..
malathion	7	1	14	7	5	3	1	1	3	3	3	0

### Amount of Insecticide for Volume of Spray

	1 gal.	6 gal.	100 gal.	Commercial dust
carbaryl (Sevin) 50% W.P.	2 tbl.	$\frac{3}{4}$ cup	2 lb.	5%
diazinon 25% E.C.	2 tsp.	4 tbl.	1 qt.	4%
malathion 50-57% E.C.	2 tsp.	4 tbl.	1 qt.	4%

E.C. = emulsion concentrate; W.P. = wettable powder. An emulsion concentrate is a chemical pesticide dissolved in a solvent to which an emulsifier has been added. It can then be mixed with water to the desired strength before being used.

<sup>1</sup> No time limitations. <sup>2</sup> Only apply insecticide late in the day after blossoms have closed to avoid bee kill.

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## FLOWER INSECTS

Insect	Insecticide <sup>1</sup>	Dosage	Suggestions
Ants, soil-nesting wasps, and sowbugs (NHE-17, 79, 93, 111) White grubs	diazinon 25% E.C.	1 cup per 1,000 sq. ft.	Drench into soil.
Aphids, mealybugs, lacebugs, scales (NHE-7, 114)	malathion 50-57% E.C.	2 tsp. per gal. water	Spray foliage thoroughly. Repeat treatments may be needed.
Blister beetles (NHE-72)	carbaryl 50% W.P.	2 tbl. per gal. water	Spray foliage. Repeat treatments may be needed.
Cutworms (NHE-77)	diazinon 25% E.C. diazinon 2% granules	6 oz. per 2-3 gal. water 5 lb. per 1,000 sq. ft.	Spray 1,000 sq. ft. soil at base of plants. Do not spray on plant foliage. Small numbers of plants can be protected with collars of paper, aluminum foil, or metal.
Grasshoppers (NHE-74)	carbaryl 50% W.P. malathion 50-57% E.C.	2 tbl. per gal. water 2 tsp. per gal. water	Spray foliage and also adjacent grassy or weedy areas.
Iris borer	dimethoate (Cygon, DeFend) 23.4% E.C. or 25% W.P.	4 tsp. per gal. water	Apply when irises are in bloom, but not on blooms and make only one application. Add a small amount of liquid detergent to spray mix to improve coverage on leaves.
Leaf-feeding beetles	carbaryl 50% W.P.	2 tbl. per gal. water	Spray foliage. Repeat treatments if needed.
Leaf-feeding caterpillars	Same as for leaf-feeding beetles		
Plant bugs and leafhoppers	Same as for leaf-feeding beetles		
Slugs (NHE-84)	metaldehyde bait Mesurol 2% bait		Apply as a bait to soil. Remove old leaves, stalks, poles, boards, and other debris where slugs like to hide and lay eggs.
Spider mites (NHE-58)	dicofol 18.5% E.C.	2 tsp. per gal. water	Pay particular attention to underside of leaves when spraying. Apply 2 or 3 times at weekly intervals.
Springtails	malathion 50-57% E.C. malathion 4% dust	2 tsp. per gal. water	Spray foliage and soil. Apply to soil at base of plants.
Stalk borers (NHE-24)	Same as for leaf-feeding beetles		Spray foliage thoroughly and frequently.
Thrips	Same as for leaf-feeding beetles		Spray foliage carefully.
White flies	pyrethrin 0.1%	aerosol spray	Spray foliage thoroughly. Repeat in 5 days.

<sup>1</sup> Use only one insecticide from those listed. Do not use oil-base sprays on plants. Do not use malathion on African violets. Do not use carbaryl on Boston ivy. Do not use diazinon on ferns. Repeated use of carbaryl foliage sprays may cause mite or aphid infestations to increase and become damaging. Do not use insecticides during full bloom. Do not use dimethoate on chrysanthemums.

E.C. = emulsion concentrate; W.P. = wettable powder.

## FOR YOUR PROTECTION

1. Store insecticides out of reach of children, irresponsible persons, or animals; store preferably in a locked cabinet.

2. If you use a bait around or in the home, place it after the children have retired and pick it up in the morning before they get up. Furthermore, place it out of their reach. At present we do not encourage use of baits for insect control.

3. Avoid breathing insecticide sprays and dusts over an extended period. This is particularly true in enclosed areas such as crawl spaces, closets, basements, and attics.

4. Wash with soap and water exposed parts of body and clothes contaminated with insecticide.

5. Wear rubber gloves when handling insecticide concentrates.

6. Do not smoke while handling or using insecticides.

7. Leave unused insecticides in their original containers with the labels on them and in locked cabinets.

8. Wash out and bury or burn and haul to the refuse dump empty insecticide containers.

9. Do not leave puddles of spray on impervious surfaces.

10. Do not apply insecticides to fish ponds.

11. Do not apply insecticides near dug wells or cisterns.

12. Observe all precautions listed on the label.

# TREE AND SHRUB INSECTS

Insects	Insecticide <sup>1</sup>	Suggestions <sup>2</sup>
Aphids (NHE-7)	diazinon malathion	Spray foliage thoroughly with force. Repeat as needed.
Bagworms (NHE-6)	carbaryl malathion <i>Bacillus thuringiensis</i>	Spray foliage thoroughly. Apply June 15. Later sprays are less effective. For late spraying, use <i>Bacillus thuringiensis</i> .
Borers (NHE-8) Flatheaded apple Bronze birch	dimethoate	Spray trunk and limbs thoroughly in late May and early June. Repeat in 3 weeks.
Ash Dogwood Lilac Peach tree	chlorpyrifos	Spray trunk and limbs in mid-June and repeat 4 weeks later.
Cankerworms	carbaryl malathion <i>Bacillus thuringiensis</i>	Spray foliage when feeding or worms are first noticed in spring.
Eastern tent caterpillars	Same as for cankerworms	Spray when nests are first noticed.
Elm leaf beetle (NHE-82)	carbaryl	Spray as soon as damage is noticed.
European pine shoot moths and Nantucket pine moth (NHE-83)	dimethoate	Spray ends of branches thoroughly in late June for European species and in mid-May for Nantucket species.
Fall webworms	carbaryl diazinon malathion <i>Bacillus thuringiensis</i>	Spray when first webs appear; clip off and destroy infested branches or burn out webs.
Galls (NHE-80, 81) Elm cockscomb Hickory Maple bladder	diazinon malathion	Spray foliage thoroughly when buds are unfolding. Sprays after galls form on leaves are ineffective.
Hackberry blister	diazinon malathion	Spray foliage thoroughly in late May. Kills psyllids in galls. Sprays after galls form on leaves are ineffective.
Cooley spruce Eastern spruce	diazinon malathion	Apply in late September or October or early spring just before buds swell.
Green-striped mapleworms	Same as for cankerworms	Spray as soon as damage is noticed.
Leaf miners Boxwood Hawthorn Oak	diazinon malathion	Spray foliage thoroughly when miners first appear. Repeat treatment in 10 to 12 days.
Birch Holly	dimethoate	Repeat treatment in 3 weeks.
Mealybugs	malathion	Spray foliage thoroughly and with force. Repeat in two weeks.
Mimosa webworms (NHE-109)	carbaryl malathion <i>Bacillus thuringiensis</i>	Spray foliage thoroughly when first nests appear (June, July). A repeat treatment may be needed.
Mites (NHE-58)	dicofol	Pay particular attention to underside of leaves. Apply 2 or 3 times at weekly intervals.
Oak kermes	malathion	Spray foliage thoroughly about July 1 to kill the crawlers.
Periodical cicadas (NHE-113)	carbaryl	Spray all branches thoroughly when adults appear. Repeat in 7 to 10 days.
Sawflies	Same as for fall webworms	Spray as soon as worms or damage is evident.
Scale (NHE-114) Cottony maple Putnam San Jose Tulip tree	diazinon malathion  dormant oil diluted according to label	Spray foliage thoroughly in early April for <i>Fletcher</i> and <i>European elm scale</i> ; in late May for <i>pine needle</i> and <i>sweet gum scale</i> ; in early June for <i>scurfy</i> , <i>oystershell</i> , and <i>euonymous scale</i> ; in early July for <i>cottony maple</i> , <i>Juniper</i> , and <i>dogwood scales</i> ; in mid-July for <i>spruce bud scale</i> ; and again in early August for <i>oystershell scale</i> .  Apply when plants are still dormant in late winter. Do not use on evergreens. For tulip tree scale, a malathion spray in late September or in early spring is also effective.

<sup>1</sup> Use only one insecticide from those listed.

<sup>2</sup> Treatment dates are listed for central Illinois. In southern Illinois apply 2 weeks earlier and in northern Illinois 2 weeks later.

### TREE AND SHRUB INSECTS (continued)

Insects	Insecticide <sup>1</sup>	Suggestions <sup>2</sup>
Sycamore lace bugs	carbaryl malathion	Spray when nymphs appear, usually in late May.
Thrips	Same as for aphids	Mainly on privet. Spray foliage thoroughly.
Yellow-necked caterpillars	carbaryl malathion	Spray foliage when worms are small.
Zimmerman pine moths	dimethoate	Spray in mid-August and again two weeks later.

<sup>1</sup> Use only one insecticide from those listed.

<sup>2</sup> Treatment dates are listed for central Illinois. In southern Illinois apply 2 weeks earlier and in northern Illinois 2 weeks later.

### Amount of Insecticide Needed for Volume of Spray

	1 gal.	6 gal.	100 gal.		1 gal.	6 gal.	100 gal.
carbaryl (Sevin) 50% W.P. <sup>1</sup>	2 tbl.	$\frac{3}{4}$ cup	2 lb.	dicofol (Kelthane) 18.5% E.C.	2 tsp.	4 tbl.	1 qt.
chlorpyrifos (Dursban) 2E.	2 tsp.	4 tbl.	1 qt.	dimethoate (Cygon, DeFend)	2 tsp.	4 tbl.	1 qt.
diazinon 25% E.C. <sup>2</sup>	2 tsp.	4 tbl.	1 qt.	23.4% E.C., 25% W.P. <sup>3</sup>			
malathion 50-57% E.C. <sup>4</sup>	2 tsp.	4 tbl.	1 qt.				

<sup>1</sup> Do not use on Boston ivy. <sup>2</sup> Do not use on ferns or hibiscus. <sup>3</sup> Do not use on chrysanthemums. <sup>4</sup> Do not use on canaert red cedar. E.C. = emulsion concentrate; W.P. = wettable powder.

### LAWN INSECTS

Insects	Insecticide <sup>1</sup>	Dosage per 1,000 sq. ft. <sup>2</sup>	Suggestions
White grubs	diazinon 25% E.C.	1 cup	Apply as spray or granules to small area and then water in thoroughly before treating another small area. Grub damage will usually occur in late August and in September.
Ants (NHE-111)	5% G.	2 $\frac{1}{2}$ lb.	
Ants (NHE-111)	diazinon 25% E.C.	$\frac{3}{4}$ cup	Apply as spray or granules and water in thoroughly. For individual nests pour 1% diazinon in nest. Seal in with dirt.
Cicada killer and other soiling-nesting wasps (NHE-57, 79)	5% G.	2 lb.	
Sod webworms (NHE-115)	carbaryl 50% W.P.	$\frac{1}{2}$ lb.	As sprays, use at least 2.5 gal. of water per 1,000 sq. ft. Do not water for 72 hours after treatment. As granules, apply from fertilizer spreader. Webworms usually damage lawns in late July and in August.
	5% G.	4 lb.	
	diazinon 25% E.C.	$\frac{3}{4}$ cup	
	5% G.	2 lb.	
	chlorpyrifos 2 E.C.	1 $\frac{1}{2}$ fl. oz.	
Millipedes and sowbugs (NHE-93)	0.5% G.	5 lb.	Spray around home where millipedes or sowbugs are crawling. If numerous, treat entire lawn.
	Aspon 13% E.C.	5 cups	
Armyworms	carbaryl 50% W.P.	2 oz.	Apply as sprays or granules. Use 5 to 10 gal. of water per 1,000 sq. ft.
Cutworms	5% G.	1 lb.	
	chlorpyrifos 2 E.C.	1 $\frac{1}{2}$ fl. oz.	
Chinch bugs	0.5% G.	5 lb.	Spray infested areas where chinch bugs are present.
	chlorpyrifos 2 E.C.	1 $\frac{1}{2}$ fl. oz.	
Aphids	Aspon 13% E.C.	5 cups	Spray grass thoroughly.
	malathion 50-57% E.C.	1 tbl.	
Chiggers	diazinon	1 tbl.	Spray grass thoroughly.
Slugs (NHE-84)	Mesurool 2% bait		Apply where slugs are numerous. Scatter in grass. For use only in flower gardens and shrubbery beds.

<sup>1</sup> Use only one insecticide from those listed.

<sup>2</sup> To determine lawn size in square feet, multiply length times width of lawn and subtract nonlawn areas including house, driveway, garden, etc. Do not allow people or pets on lawn until the spray has dried.

E.C. = emulsion concentrate; W.P. = wettable powder; G. = granules.

## ANIMAL AND NUISANCE INSECTS

Insects	Insecticide <sup>1</sup>	Method of application	Suggestions
Ants (NHE-111) Crickets Spiders (NHE-116, 17) Centipedes (NHE-93) Assassin bugs	diazinon 0.5% spray diazinon 0.5% P.S.C. propoxur 0.5% P.S.C.	<i>Outdoors:</i> Use a water-base spray of diazinon. Spray on outside of foundation of house.	To prevent insect migrations into house, spray completely around outside foundation wall and adjacent 4-inch strip of soil. <i>Indoors:</i> Use diazinon or propoxur oil-base sprays in pressurized spray cans. Apply to baseboards, cracks, and door thresholds.
Bed bugs	malathion 1% spray malathion 1% dust	Spray slats, springs, and bed frame thoroughly.	Apply a light dust to seams, tufts, and folds of mattresses. Use clean bedding.
Booklice or barklice	pyrethrin 0.1% P.S.C.	Spray undersides of bookshelves and infested areas.	Remove books and papers from damp storage areas; spray where booklice are found. Improve ventilation.
Boxelder bugs (NHE-9)	diazinon 0.5% spray carbaryl 1% spray	<i>Outdoors:</i> Spray trunks of infested boxelder trees during late summer when bugs are present.	<i>Outdoors:</i> Spray the clusters of boxelder bugs on trunks of trees, foundation walls, under eaves, and other areas where they gather. Removal of seed-bearing boxelder trees is also helpful. <i>Indoors:</i> Remove with vacuum or broom.
Chiggers (NHE-127)	malathion 1% spray diazinon 0.5% spray	<i>Outdoors:</i> Treat bushes, lawn, fence rows, along roadsides, and areas not regularly mowed.	For personal protection a repellent such as DEET, will help prevent attack. Take a warm soapy shower or bath immediately after returning from a chigger-infested area.
Wood ticks (NHE-56)	carbaryl 1% spray diazinon 0.5% spray malathion 1% spray		
Clover mites (NHE-2)	dicofol 0.03% spray	Purchase E.C. and dilute with water. Spray outside of house from ground up to windows and adjacent 10 ft. of lawn.	Repeat spray in 7-10 days if necessary. Remove grass and weeds from 18-inch strip next to foundation. <i>Indoors:</i> Remove with vacuum, or spray with 0.1% pyrethrin from a P.S.C. in house.
Cluster flies (NHE-1)	dichlorvos 20% resin strip <sup>2</sup> pyrethrin 0.1% P.S.C.	1 strip per 1,000 cu. ft. in attic or room. Fog lightly in room.	Repeat spray with pyrethrin as needed. Seal cracks around windows, eaves, and siding to prevent entry.
Drain flies (NHE-91)	<i>Outdoors:</i> malathion 0.5% spray <i>Indoors:</i> pyrethrin 0.1% in P.S.C., or 20% dichlorvos resin strip <sup>2</sup>	Spray shrubbery, tall grass, and refuse containers. Use fine mist or fog of pyrethrin or 1 resin strip per 1,000 cu. ft.	<i>Indoors:</i> Use chemicals only after solving sanitation problems. Clean out overflow drains, drain traps, and cellar drains. Pour boiling water or rubbing alcohol into overflow drain to eliminate maggots.
Elm leaf beetles (NHE-82)	pyrethrin 0.1% P.S.C. carbaryl 1% spray	<i>Indoors:</i> Use vacuum or sprays with pyrethrin.	<i>Outdoors:</i> Spray with carbaryl on nearby Chinese elm trees for control of elm leaf beetle larvae and adults. Seal cracks around windows to prevent entry.
Fleas (NHE-107) Brown dog tick (NHE-56)	carbaryl 5% dust malathion 4% dust	Dust areas inside and outside the home where the pet rests. Dust pets directly as needed.	<i>Indoors:</i> For heavy infestations of ticks or fleas mist with 0.1% pyrethrin in infested rooms at frequent intervals. Vacuum rugs and upholstered furniture thoroughly. (Do not use carbaryl on kittens less than 4 weeks old.)
House flies (NHE-16) Gnats Midges Mosquitoes (NHE-94) Punkies	<i>Outdoors:</i> malathion 1% spray  <i>Indoors:</i> pyrethrin 0.1% space spray; or dichlorvos 20% resin strips <sup>2</sup>	Purchase E.C. and dilute with water. Spray shrubbery, flowers, tall grass, around doorways and refuse containers and other resting sites. Use fine mist or fog of pyrethrin or use one 20% dichlorvos resin strip per 1,000 cu. ft.	Dispose of refuse twice each week. Eliminate standing water in eave troughs, tires, toys, tin cans, children's swimming pools, etc. Use a repellent like DEET when entering mosquito-infested areas. Use screening and keep repaired. Dichlorvos resin strips give good control in tight enclosed areas for about 3 months. Fly swatters are also effective.
Ground beetles Black vine weevils Clover leaf weevils	diazinon 0.5% spray carbaryl 1% spray	Spray outside foundation of house.	<i>Indoors:</i> Use vacuum and pick up beetles. They are attracted to indoor and porch lights. Where possible use yellow bulbs outside.

<sup>1</sup> Whenever possible purchase specially prepared ready-to-use forms of insecticides for indoor use. Use only one insecticide from those listed. When preparing a quantity of 1 gallon or more of a spray of a desired percentage, use the dilution table on page 8. You need to know only the formulation of the insecticide when using the dilution table.

<sup>2</sup> Do not use in pet shops or if tropical fish are present. Do not use in kitchens, restaurants, or areas where food is present. Do not use in nurseries or rooms where infants, ill, or aged persons are confined. Do not use in hospitals or medical clinics.

E.C. = emulsion concentrate; W.P. = wettable powder; P.S.C. = pressurized spray can; O. = oil solution (usually in pressurized spray can).

(SEE PESTICIDE DILUTION TABLE ON PAGE 8)

### ANIMAL AND NUISANCE INSECTS (continued)

Insects	Insecticide <sup>1</sup>	Method of application	Suggestions
Lice, human	malathion 1% dust carbaryl 5% dust	1 oz. per adult person	Dust lightly over body hair, and wash clothing and bedding. Repeat in 2 weeks if needed. Do not get in eyes.
Millipedes, sowbugs (NHE-93)	diazinon 0.5% spray carbaryl 1% spray	Spray outside foundation and at least 3 ft. of adjacent soil.	Treat entire lawn as for webworms if pests are abundant. Remove debris from ground along foundation. Collect with vacuum when found indoors.
Picnic beetles	carbaryl 1% spray malathion 1% spray diazinon 0.5% spray	Spray garbage pails, decaying vegetables, and refuse.	Additional treatments every 4 or 5 days may be needed. Pick fruits and vegetables before they become overripe to reduce the problem.
Springtails (NHE-70)	diazinon 0.5% spray malathion 0.5% spray	<i>Outdoors:</i> Spray soil next to the house, especially grassy moist areas.	Eliminate low moist spots around the house. <i>Indoors:</i> Use vacuum. Allow soil to dry in potted plants or planter boxes.
Wasps (NHE-79) Hornets (NHE-17) Bees	carbaryl 1% spray or 5% dust; dichlorvos 0.5% P.S.C. dichlorvos 20% resin strip <sup>2</sup>	Hanging dichlorvos resin strips in attic will help prevent infestations. For quick kill use dichlorvos 0.5%.	For nests below ground, apply carbaryl and seal opening with soil. For bees, spray nests in partitions. Drill holes through siding to inject insecticide, if necessary. Nests and honey should be removed and destroyed. Treat nests after dark.

### FOOD, FABRIC, AND STRUCTURAL INSECTS

Insects	Insecticide <sup>1</sup>	Method of application	Suggestions
Carpenter ants (NHE-10)	diazinon 0.5% P.S.C. propoxur 0.5% P.S.C.	Spray nest entrances and runways.	Use foundation spray as recommended for ants. Treat nests directly for best results.
Carpet beetles (NHE-87) Tissue paper beetles Clothes moths (NHE-87)	diazinon 0.5% P.S.C. chlorpyrifos 0.5% P.S.C.	Spray storage areas and infested places like the back and edge of carpeting, baseboards, beneath drawers, etc.	Prevent lint and dust from accumulating. Clean hot air registers and cold air shafts. Dry cleaning kills these pests. Store cleaned or washed woolens in insect-free chests and plastic bags.
Larder beetles	None		Remove source such as dead animal carcasses.
Cockroaches: German (NHE-3) Brown-banded (NHE-4) American (NHE-5) Oriental (NHE-5)	diazinon 0.5% P.S.C. propoxur 0.5% P.S.C. chlorpyrifos 0.5% P.S.C.	Spray runways and hiding places. Repeat treatments may be needed in 2 or 3 weeks.	Treat under sink, refrigerator, cabinets, on baseboards, etc. Complete treatment throughout home may be needed for successful control of brown-banded roach.
Pantry and cereal insects Saw-toothed grain beetles (NHE-11) Cigarette beetles	chlorpyrifos 0.5% P.S.C. <sup>3</sup> diazinon 0.5% P.S.C. <sup>3</sup> propoxur 0.5% P.S.C. <sup>3</sup> pyrethrin 0.1% P.S.C.	Spray inside of food cabinets very lightly and only after shelves are empty and cleaned.	Discard infested packages. Scrub or vacuum food cabinets and shelves. Force spray into cracks and crevices; allow to dry; cover shelves with clean, fresh paper. Do not contaminate food or utensils with insecticide.
Powder-post beetles (NHE-85)	lindane 0.5% O. Pentachlorophenol 5% O.	Paint, spray, or dip to saturate infested unfinished wood.	Pentachlorophenol is a wood preservative also, but it has a strong persistent odor. Follow label directions.
Silverfish (NHE-86)	diazinon 0.5% P.S.C. propoxur 0.5% P.S.C. chlorpyrifos 0.5% P.S.C.	Spray runways, baseboards, closets, and places where pipes go through the walls.	Repeat treatments in 2 weeks if needed. Keep books and papers in dry places.
Termites (NHE-57)	chlordane 1% Purchase E.C. and dilute with water or oil	For soil injection along the building foundation and under footings, use 1 gal. per 2 cu. ft. of soil.	Remove termite mud tubes connecting wood to soil. Eliminate wood-to-soil contacts. Ventilate to keep unexcavated areas dry.

<sup>1</sup> Whenever possible purchase specially prepared ready-to-use forms of insecticides for indoor use. Use only one insecticide from those listed. When preparing a quantity of 1 gallon or more of a spray of a desired percentage, use the dilution table on page 8. You need to know only the formulation of the insecticide when using the dilution table.

<sup>2</sup> Do not use in pet shops or if tropical fish are present. Do not use in kitchens, restaurants, or areas where food is present. Do not use in nurseries or rooms where infants, ill, or aged persons are confined. Do not use in hospitals or medical clinics.

<sup>3</sup> For use only by pest control operators. Homeowners should use 0.1% pyrethrin.

E.C. = emulsion concentrate; W.P. = wettable powder; P.S.C. = pressurized spray can; O = oil solution (usually in pressurized spray can).

(SEE PESTICIDE DILUTION TABLE ON PAGE 8)

## PESTICIDE DILUTION TABLE

**HOW TO USE:** When preparing a spray of a desired percentage you need to know only the formulation of the particular product (examples: Kelthane 18.5% wettable powder; Kelthane 18.5% emulsion concentrate). For instance, if you were preparing a 1% chlordane solution for spraying the foundation of the home, you would mix 5 tablespoons of chlordane 45% E.C. into each gallon of water. The formulations of insecticides in the table may be purchased from hardware stores, pest control establishments, lawn and garden centers, and other sources. For some jobs, such as spraying outdoors to control flies or mosquitoes, a gallon or more of properly diluted spray is required. To obtain the percent concentration suggested for controlling a particular insect, add the amount of pesticide suggested in the table to one gallon of water.

Pesticide formulation	Amt. insecticide needed per gal. spray		
	Desired concentration		
	0.03%	0.5%	1.0%
carbaryl (Sevin) 50% W.P.	..	4 tbsp.	8 tbsp.
chlordane 45% E.C.	..	8 tsp.	5 tbsp.
chlordane 72% E.C.	..	4 tsp.	8 tsp.
diazinon (Spectracide) 25% E.C.	..	5 tbsp.	10 tbsp.
dicofol (Kelthane) 18.5% W.P.	2 tsp.	..	..
dicofol (Kelthane) 18.5% E.C.	1½ tsp.	..	..
Dursban 2E.	..	..	3 tbsp.
malathion 50-57% E.C.	..	7 tsp.	4½ tbsp.

(tbsp. = tablespoon; tsp. = teaspoon)

## Conversion Table for Small Quantities

1 level tablespoon = 3 level teaspoons	1 pint = 2 cups
1 fluid ounce = 2 tablespoons	1 quart = 2 pints or 32 fluid ounces
1 cup = 8 fluid ounces or 16 tablespoons	1 gallon = 4 quarts or 128 fluid ounces

## NAMES OF INSECTICIDES

Below is a list of the common names of insecticides used in the preceding tables, followed by the commercial trade name and the chemical name. Some products may be available under a variety of trade names not listed below. Be sure to read the label. The label on the container always lists these products by the common name or chemical name.

Common Name	Trade Name	Chemical Name
carbaryl	Sevin	1-naphthyl methylcarbamate
chlorpyrifos	Dursban	O, O-diethyl O-(3,5,6-trichloro-2-pyridyl) phosphorothioate
DEET	Off, Kik	N, N-diethyl-m-toluamide
diazinon	Spectracide	O, O-diethyl O-(2-isopropyl-4-methyl-6-pyrimidyl) phosphorothioate
dichlorvos	Vapona, DDVP	2,2-dichlorovinyl dimethyl phosphate
dicofol	Kelthane	4,4'-dichloro-a-(tri = chloromethyl) benzhydrol
dimethoate	DeFend, Cygon	O, O-dimethyl S-(N-Methyl carbamoyl methyl) phosphorodithioate
ethyl hexanediol	6-12, Rutgers 612	2-ethyl-1, 3-hexanediol
malathion	Cythion	diethyl mercaptosuccinate, S-ester with O, O-dimethyl phosphorothioate
propoxur	Baygon	O-isopropoxyphenyl methyl carbamate
pyrethrin		principally from plant species <i>Chrysanthemum cinariaefolium</i>

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